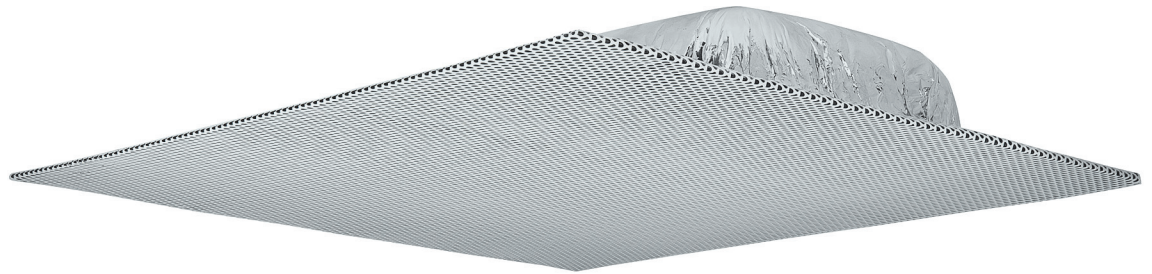


FF 220T

Flat Field® 2' x 2' Ceiling Speakers



Extron® Electronics
INTERFACING, SWITCHING AND CONTROL

Safety Instructions • English



This symbol is intended to alert the user of important operating and maintenance (servicing) instructions in the literature provided with the equipment.



This symbol is intended to alert the user of the presence of uninsulated dangerous voltage within the product's enclosure that may present a risk of electric shock.

Caution

Read Instructions • Read and understand all safety and operating instructions before using the equipment.

Retain Instructions • The safety instructions should be kept for future reference.

Follow Warnings • Follow all warnings and instructions marked on the equipment or in the user information.

Avoid Attachments • Do not use tools or attachments that are not recommended by the equipment manufacturer because they may be hazardous.

Consignes de Sécurité • Français



Ce symbole sert à avertir l'utilisateur que la documentation fournie avec le matériel contient des instructions importantes concernant l'exploitation et la maintenance (réparation).



Ce symbole sert à avertir l'utilisateur de la présence dans le boîtier de l'appareil de tensions dangereuses non isolées posant des risques d'électrocution.

Attention

Lire les instructions• Prendre connaissance de toutes les consignes de sécurité et d'exploitation avant d'utiliser le matériel.

Conserver les instructions• Ranger les consignes de sécurité afin de pouvoir les consulter à l'avenir.

Respecter les avertissements • Observer tous les avertissements et consignes marqués sur le matériel ou présentés dans la documentation utilisateur.

Sicherheitsanleitungen • Deutsch



Dieses Symbol soll dem Benutzer in der im Lieferumfang enthaltenen Dokumentation besonders wichtige Hinweise zur Bedienung und Wartung (Instandhaltung) geben.



Dieses Symbol soll den Benutzer darauf aufmerksam machen, daß im Inneren des Gehäuses dieses Produktes gefährliche Spannungen, die nicht isoliert sind und die einen elektrischen Schock verursachen können, herrschen.

Achtung

Lesen der Anleitungen • Bevor Sie das Gerät zum ersten Mal verwenden, sollten Sie alle Sicherheits- und Bedienungsanleitungen genau durchlesen und verstehen.

Aufbewahren der Anleitungen • Die Hinweise zur elektrischen Sicherheit des Produktes sollten Sie aufbewahren, damit Sie im Bedarfsfall darauf zurückgreifen können.

Befolgen der Warnhinweise • Befolgen Sie alle Warnhinweise und Anleitungen auf dem Gerät oder in der Benutzerdokumentation.

Keine Zusatzgeräte • Verwenden Sie keine Werkzeuge oder Zusatzgeräte, die nicht ausdrücklich vom Hersteller empfohlen wurden, da diese eine Gefahrenquelle darstellen können.

Instrucciones de seguridad • Español



Este símbolo se utiliza para advertir al usuario sobre instrucciones importantes de operación y mantenimiento (o cambio de partes) que se desean destacar en el contenido de la documentación suministrada con los equipos.



Este símbolo se utiliza para advertir al usuario sobre la presencia de elementos con voltaje peligroso sin protección aislante, que puedan encontrarse dentro de la caja o alojamiento del producto, y que puedan representar riesgo de electrocución.

Precaucion

Leer las instrucciones • Leer y analizar todas las instrucciones de operación y seguridad, antes de usar el equipo.

Conservar las instrucciones • Conservar las instrucciones de seguridad para futura consulta.

Obedecer las advertencias • Todas las advertencias e instrucciones marcadas en el equipo o en la documentación del usuario, deben ser obedecidas.

安全须知 • 中文



这个符号提示用户该设备用户手册中有重要的操作和维护说明。



这个符号警告用户该设备机壳内有暴露的危险电压，有触电危险。

注意

阅读说明书 • 用户使用该设备前必须阅读并理解所有安全和使用说明。

保存说明书 • 用户应保存安全说明书以备将来使用。

遵守警告 • 用户应遵守产品和用户指南上的所有安全和操作说明。

避免追加 • 不要使用该产品厂商没有推荐的工具或追加设备，以避免危险。

Warning

Power sources • This equipment should be operated only from the power source indicated on the product. This equipment is intended to be used with a main power system with a grounded (neutral) conductor. The third (grounding) pin is a safety feature, do not attempt to bypass or disable it.

Power disconnection • To remove power from the equipment safely, remove all power cords from the rear of the equipment, or the desktop power module (if detachable), or from the power source receptacle (wall plug).

Power cord protection • Power cords should be routed so that they are not likely to be stepped on or pinched by items placed upon or against them.

Servicing • Refer all servicing to qualified service personnel. There are no user-serviceable parts inside. To prevent the risk of shock, do not attempt to service this equipment yourself because opening or removing covers may expose you to dangerous voltage or other hazards.

Slots and openings • If the equipment has slots or holes in the enclosure, these are provided to prevent overheating of sensitive components inside. These openings must never be blocked by other objects.

Lithium battery • There is a danger of explosion if battery is incorrectly replaced. Replace it only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Eviter les pièces de fixation • Ne pas utiliser de pièces de fixation ni d'outils non recommandés par le fabricant du matériel car cela risquerait de poser certains dangers.

Avertissement

Alimentations • Ne faire fonctionner ce matériel qu'avec la source d'alimentation indiquée sur l'appareil. Ce matériel doit être utilisé avec une alimentation principale comportant un fil de terre (neutre). Le troisième contact (de mise à la terre) constitue un dispositif de sécurité : n'essayez pas de la contourner ni de la désactiver.

Déconnexion de l'alimentation• Pour mettre le matériel hors tension sans danger, déconnectez tous les cordons d'alimentation de l'arrière de l'appareil ou du module d'alimentation de bureau (s'il est amovible) ou encore de la prise secteur.

Protection du cordon d'alimentation • Acheminer les cordons d'alimentation de manière à ce que personne ne risque de marcher dessus et à ce qu'ils ne soient pas écrasés ou pincés par des objets.

Réparation-maintenance • Faire exécuter toutes les interventions de réparation-maintenance par un technicien qualifié. Aucun des éléments internes ne peut être réparé par l'utilisateur. Afin d'éviter tout danger d'électrocution, l'utilisateur ne doit pas essayer de procéder lui-même à ces opérations car l'ouverture ou le retrait des couvercles risquent de l'exposer à de hautes tensions et autres dangers.

Fentes et orifices • Si le boîtier de l'appareil comporte des fentes ou des orifices, ceux-ci servent à empêcher les composants internes sensibles de surchauffer. Ces ouvertures ne doivent jamais être bloquées par des objets.

Lithium Batterie • Il a danger d'explosion s'il y a remplacement incorrect de la batterie. Remplacer uniquement avec une batterie du même type ou d'un ype équivalent recommandé par le constructeur. Mettre au reut les batteries usagées conformément aux instructions du fabricant.

Vorsicht

Stromquellen • Dieses Gerät sollte nur über die auf dem Produkt angegebene Stromquelle betrieben werden. Dieses Gerät wurde für eine Verwendung mit einer Hauptstromleitung mit einem geerdeten (neutralen) Leiter konzipiert. Der dritte Kontakt ist für einen Erdschluß, und stellt eine Sicherheitsfunktion dar. Diese sollte nicht umgangen oder außer Betrieb gesetzt werden.

Stromunterbrechung • Um das Gerät auf sichere Weise vom Netz zu trennen, sollten Sie alle Netzkabel aus der Rückseite des Gerätes, aus der externen Stromversorgung (falls dies möglich ist) oder aus der Wandsteckdose ziehen.

Schutz des Netzkabels • Netzkabel sollten stets so verlegt werden, daß sie nicht im Weg liegen und niemand darauf treten kann oder Objekte darauf- oder unmittelbar dagegengestellt werden können.

Wartung • Alle Wartungsmaßnahmen sollten nur von qualifiziertem Servicepersonal durchgeführt werden. Die internen Komponenten des Gerätes sind wartungsfrei. Zur Vermeidung eines elektrischen Schocks versuchen Sie in keinem Fall, dieses Gerät selbst öffnen, da beim Entfernen der Abdeckungen die Gefahr eines elektrischen Schlags und/oder andere Gefahren bestehen.

Schlitze und Öffnungen • Wenn das Gerät Schlitze oder Löcher im Gehäuse aufweist, dienen diese zur Vermeidung einer Überhitzung der empfindlichen Teile im Inneren. Diese Öffnungen dürfen niemals von anderen Objekten blockiert werden.

Litium-Batterie • Explosionsgefahr, falls die Batterie nicht richtig ersetzt wird. Ersetzen Sie verbrauchte Batterien nur durch den gleichen oder einen vergleichbaren Batterietyp, der auch vom Hersteller empfohlen wird. Entsorgen Sie verbrauchte Batterien bitte gemäß den Herstelleranweisungen.

Evitar el uso de accesorios • No usar herramientas o accesorios que no sean específicamente recomendados por el fabricante, ya que podrían implicar riesgos.

Advertencia

Alimentación eléctrica • Este equipo debe conectarse únicamente a la fuente/tipo de alimentación eléctrica indicada en el mismo. La alimentación eléctrica de este equipo debe provenir de un sistema de distribución general con conductor neutro a tierra. La tercera pata (puesta a tierra) es una medida de seguridad, no puentearla ni eliminarla.

Desconexión de alimentación eléctrica • Para desconectar con seguridad la acometida de alimentación eléctrica al equipo, desenchufar todos los cables de alimentación en el panel trasero del equipo, o desenchufar el módulo de alimentación (si fuera independiente), o desenchufar el cable del receptáculo de la pared.

Protección del cables de alimentación • Los cables de alimentación eléctrica se deben instalar en lugares donde no sean pisados ni apretados por objetos que se puedan apoyar sobre ellos.

Reparaciones/mantenimiento • Solicitar siempre los servicios técnicos de personal calificado. En el interior no hay partes a las que el usuario deba acceder. Para evitar riesgo de electrocución, no intentar personalmente la reparación/mantenimiento de este equipo, ya que al abrir o extraer las tapas puede quedar expuesto a voltajes peligrosos u otros riesgos.

Ranuras y aberturas • Si el equipo posee ranuras o orificios en su caja/alojamiento, es para evitar el sobrecalentamiento de componentes internos sensibles. Estas aberturas nunca se deben obstruir con otros objetos.

Batería de litio • Existe riesgo de explosión si esta batería se coloca en la posición incorrecta. Cambiar esta batería únicamente con el mismo tipo (o su equivalente) recomendado por el fabricante. Desachar las baterías usadas siguiendo las instrucciones del fabricante.

警告

电源 • 该设备只能使用产品上标明的电源。设备必须使用有地线的供电系统供电。 第三条线（地线）是安全设施，不能不用或跳过。

拔掉电源 • 为安全地从设备拔掉电源，请拔掉所有设备后或桌面电源的电源线，或任何接到市电系统的电源线。

电源线保护 • 妥善布线，避免被踩踏，或重物挤压。

维护 • 所有维修必须由认证的维修人员进行。设备内部没有用户可以更换的零件。为避免出现触电危险不要自己试图打开设备盖子维修该设备。

通风孔 • 有些设备机壳上有通风槽或孔，它们是用来防止机内敏感元件过热。 不要用什么东西挡住通风孔。

锂电池 • 不正确的更换电池会有爆炸的危险。必须使用与厂家推荐的相同或相近型号的电池。按照生产厂的建议处理废弃电池。

The following symbols are used throughout the manual and carry the following meanings:

TIP: A Tip provides a suggestion to make setting up or working with the device easier.

NOTE: A Note draws attention to important information.

CAUTION: A Caution warns of things that might damage the equipment.

WARNING: A Warning warns of things that might cause injury, death, or other severe consequences.

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Trademarks

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Introduction

About this User Guide

This user guide contains information about the Extron FF 220T Flat Field 2' x 2' Ceiling Speakers.

The FF 220T features a low profile design that houses a 3-inch driver and has the appearance of a standard ventilation grill. All the drivers and components above the ceiling are hidden behind the grill.

The FF 220T is designed for use in plenum rated ceiling spaces and can be mounted into a standard 2' x 2' or 2' x 4' (with supplied cross bars) false ceiling tile space on a T-bar grid, or a frame installed in solid ceilings.

Features

- **Drop-in ceiling tile speakers for suspended ceilings**
- **UL 2043 plenum rated enclosure**
- **Extron patent pending Flat Field technology for consistent sound levels across the listening area, reducing the number of speakers required**
- **A 3-inch (7.6 cm) horn-loaded, full range driver provides extended low frequency response.**
- **The white perforated grille matches the appearance of air conditioning vents.**
- **8 ohm direct or 70/100 volt operation with 16, 8, 4, 2, and 1 watt selectable power taps accessed with speaker wiring connections inside the rear panel**
- **Frequency response of 68 Hz to 18 kHz**
- **16 watts continuous pink noise, 32 watts continuous program rated**
- **Wide 170° dispersion**
- **Low profile enclosure for plenum environments**
- **5 year parts and labor warranty**

Installation

This section discusses how to install the FF 220T speakers.

CAUTION: Installation and service must be performed by authorized personnel only.

Application Example

The following illustration is an application example.

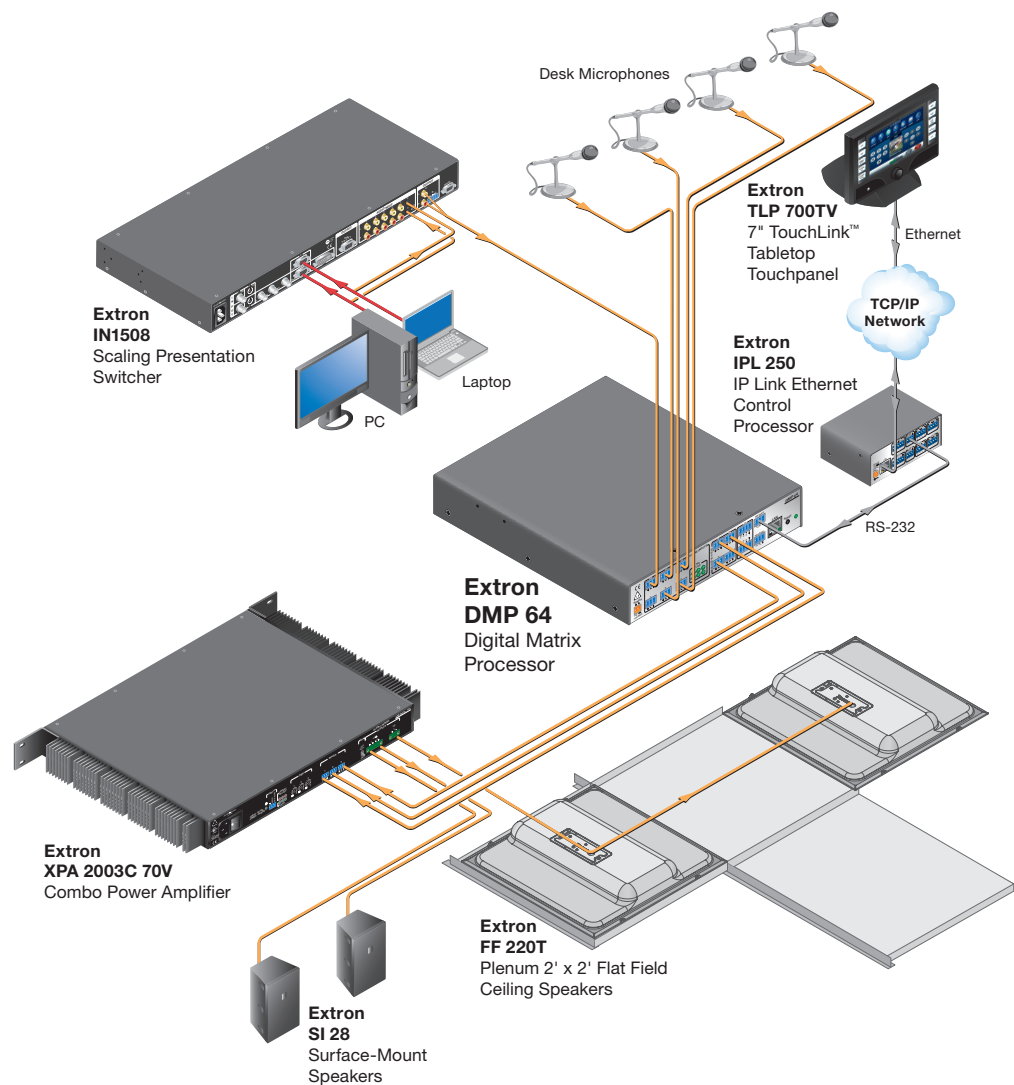


Figure 1. FF 220T application example

Installation Considerations

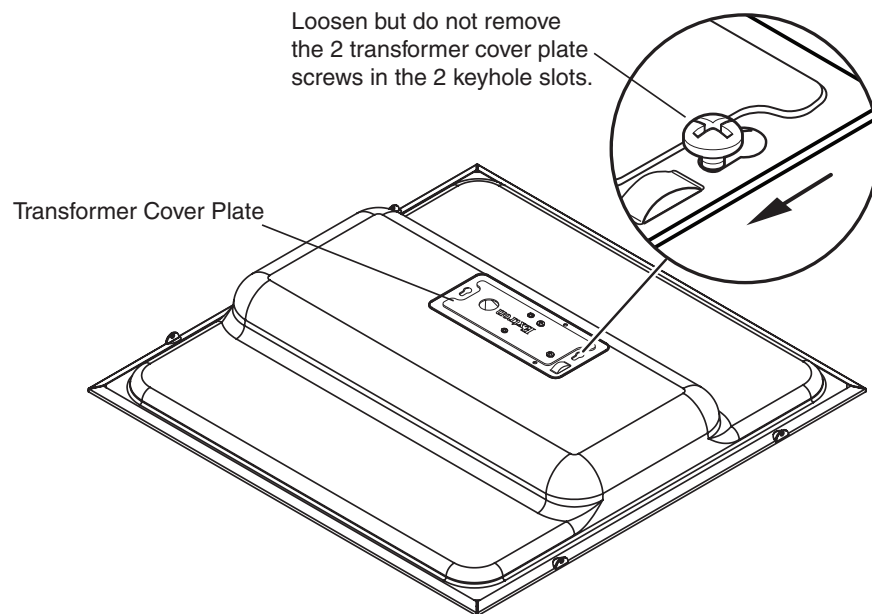
- Installation of conduit and conduit adapters must conform to all applicable building codes and local ordinances.
- Installation in a plenum-rated environment requires a wire gauge of 12 AWG to 18 AWG. Conduit may be required.

NOTE: If you are daisy chaining speakers in 70 V or 100 V configuration, the maximum wire gauge is 16 AWG.
If you are daisy chaining speakers in direct (8 ohm) configuration, the maximum wire gauge is 14 AWG.

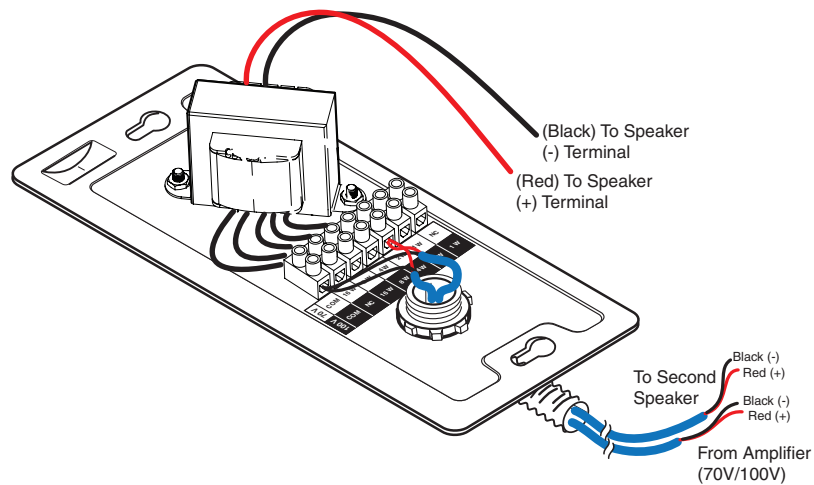
- If using seismic supports, the installer provides the cables.
- Wiring connections depend on whether or not a distributed (70 or 100 volt) audio system is installed with these speakers.

Installing the Speaker

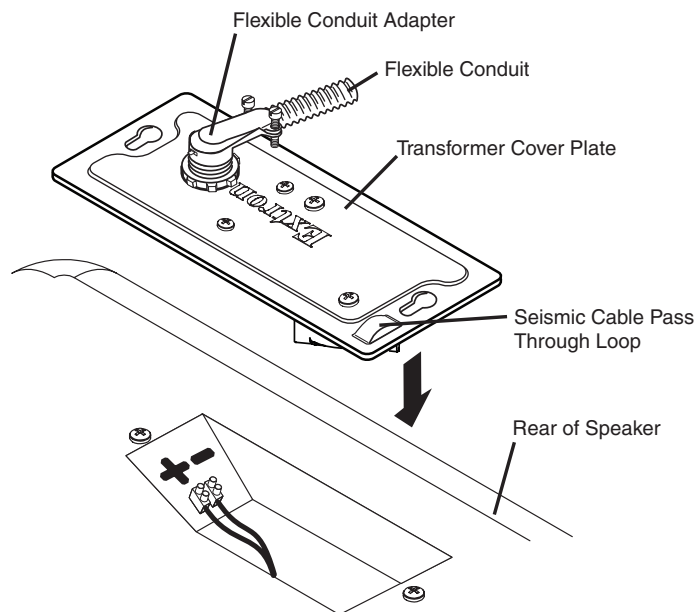
1. **Power down** — Power down all attached devices before proceeding.
2. **Remove the suspended ceiling tile** — Remove the 2' x 2' ceiling tile where the FF 220T will be installed as shown below. If the ceiling has 2' x 4' tiles, cut the tile in half.
3. **Remove the terminal cover plate** — Loosen (do not remove) the two screws on the top terminal cover plate and remove the cover plate as shown below.



4. **Routing cables through the transformer cover plate** — Slide and remove the terminal cover plate. The transformer cover plate is mounted to the speaker with the transformer side down. See the illustration below.

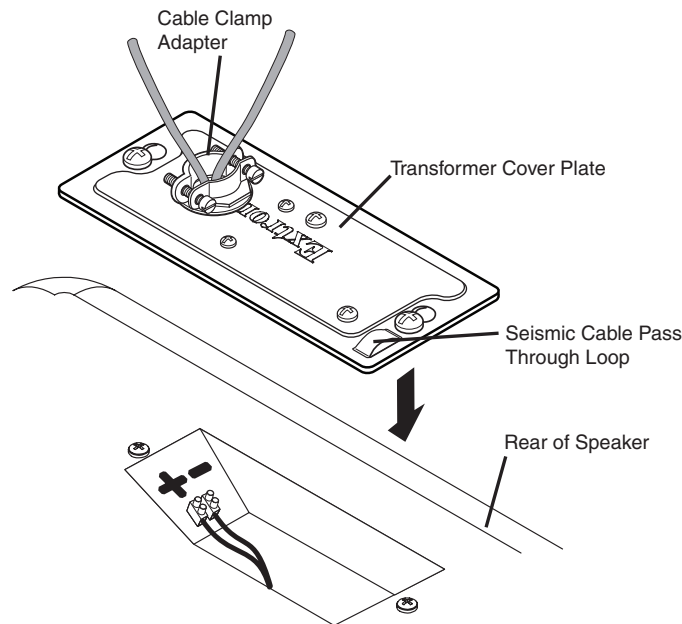


5. **When using flexible conduit** — Insert the conduit into the cover plate opening using an appropriate conduit adapter, and secure the conduit to the plate. See below.



NOTE: Installation of conduit and conduit adapters should conform to all applicable building codes and local ordinances.

When using speaker wires without a conduit — Secure the cable clamp adapter (included) to the cover plate and insert the wires through the clamp. See the following illustration.

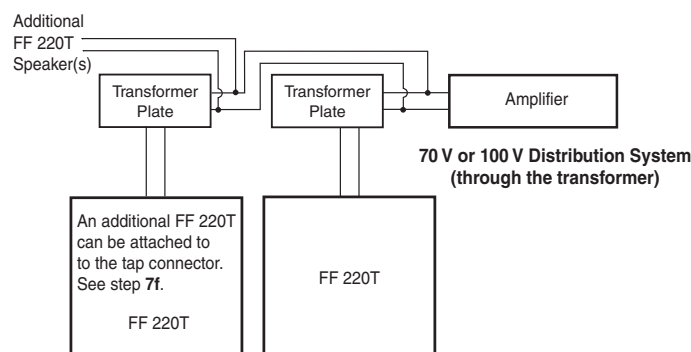


6. Proceed to step **7 (going through the transformer)** or **9 (bypassing the transformer)** for the appropriate wiring procedure for either a distributed audio system (70 V or 100 V line distribution through the transformer) or for a direct connection from an amplifier (bypassing the transformer).

NOTE: In the 70 V or 100 V distribution system block diagram below, an optional speaker has been added as an example of daisy chaining FF 220T speakers to a single amplifier output.

Wiring for Installation in a 70 V or 100 V Audio Distribution System (through the transformer)

7. Connect cables from the amplifier to the transformer on the FF 220T terminal cover plate.



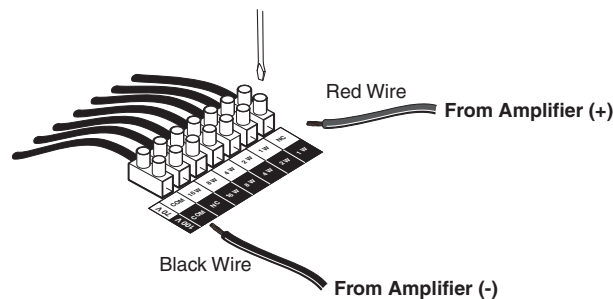
- a. If a conduit is used, pull the wires from the amplifier through and out of the conduit.
- b. Route the two wires from the amplifier through the cover plate hole to the transformer side.

- c. Strip 3/16 inch (5 mm) from the wire ends and keep the wire end strands together by twisting them. Do not tin the wires.
- d. Secure the wires to the appropriate taps on the captive screw connectors of the seven-connector terminal block (on the transformer side of the cover plate) as indicated on the tap label. See the note below.

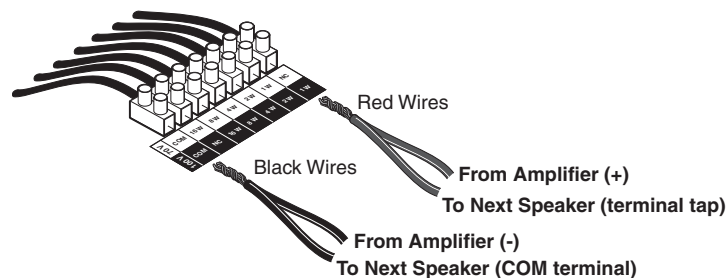
NOTE: Observe the 70 V or 100 V system designation as indicated on the tap label.

70 V	COM	16 W	8 W	4 W	2 W	1 W	NC
100 V	COM	NC	16 W	8 W	4 W	2 W	1 W

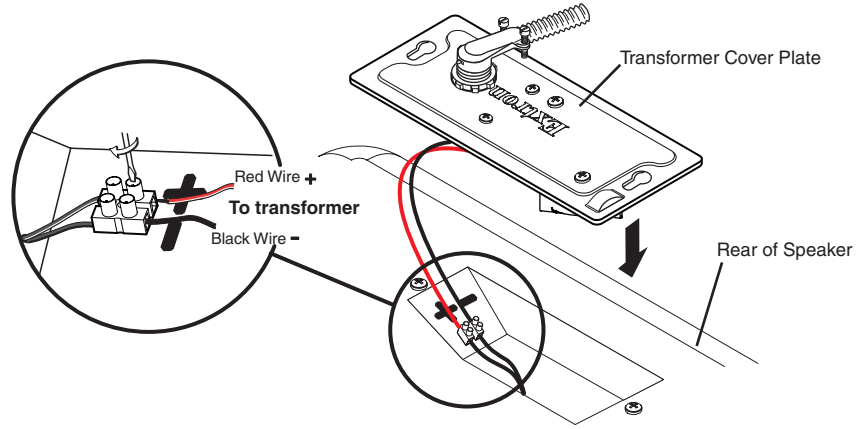
When wiring to a single speaker, the black negative (-) wire attaches to the "COM" terminal, and the red positive (+) wire attaches to the desired terminal tap. See below.



- e. Use a small flat blade screwdriver to tighten the terminal block screws.
- f. To wire additional speakers, route the speaker wires from the second speaker through the cover plate hole to the transformer side. Twist the black negative (-) wires together and the red positive (+) wires together before inserting them into the terminal block. Additional speakers can be daisy-chained this way. See below.



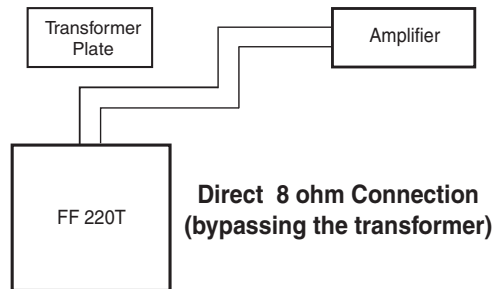
8. Connect wires from the transformer to the speaker.
 - a. Keep the wire strands together by twisting them (do not tin the wires).
 - b. Connect the red positive (+) wire to the + speaker terminal and connect the black negative (-) wire to the - speaker terminal as shown below.



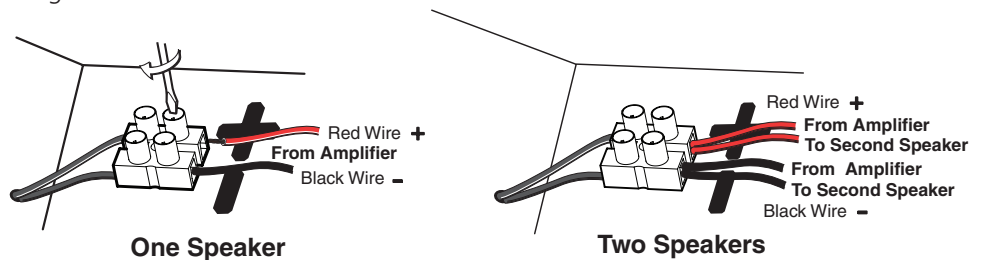
- c. Proceed to step 10.

Wiring for Installation with Direct 8 ohm Connection to an Amplifier (bypassing the transformer)

9. See the block diagram below.

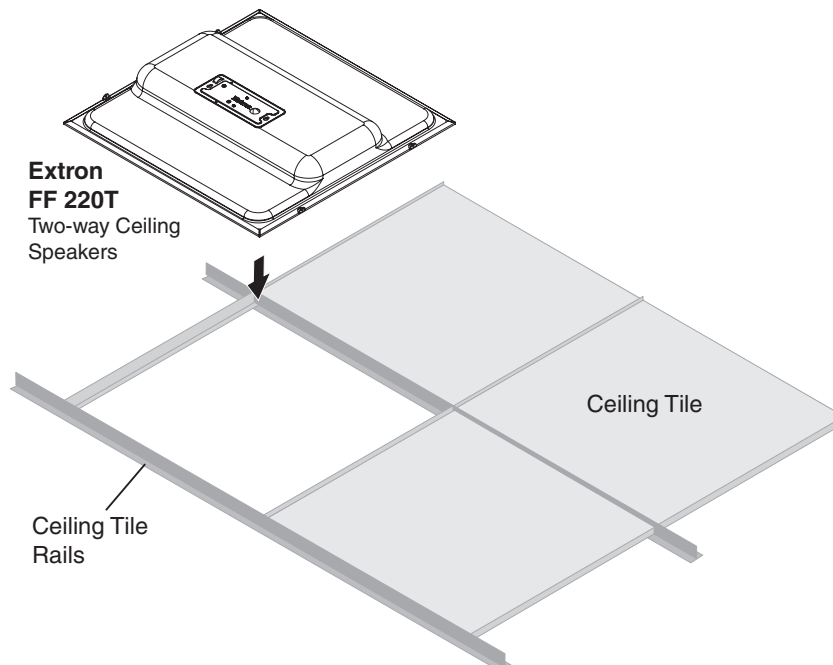


- a. Route the wires from the amplifier to the speaker using the same procedure for routing speaker wire (and conduit if applicable) through the cover plate as described in step 5. Strip 3/16 inch (5 mm) from the ends of the two speaker wire leads (+ and -) coming from the amplifier. Keep the wire strands together by twisting them (do not tin the wires), and secure the wires to the input terminals of the speaker, observing the correct polarity.
- b. Connect the red positive (+) wire to the + speaker terminal and the black negative (-) wire to the - speaker terminal depending on whether one or two speakers are being connected.

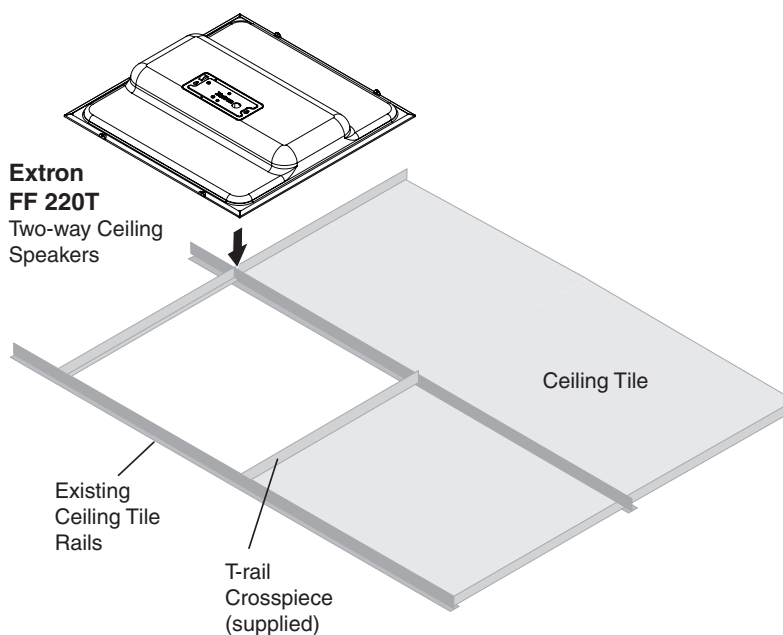


Finishing Steps, All Installation Types

10. Replace the transformer cover plate and tighten the two cover plate screws that were loosened in step 3.
11. Temporarily test the system and speakers by powering on the amplifier and listening for the correct response from the speakers, then disconnect power from the amplifier.
12. For installation in a 2' x 2' ceiling tile, remove a tile and place the speaker on the existing support rails as shown below.



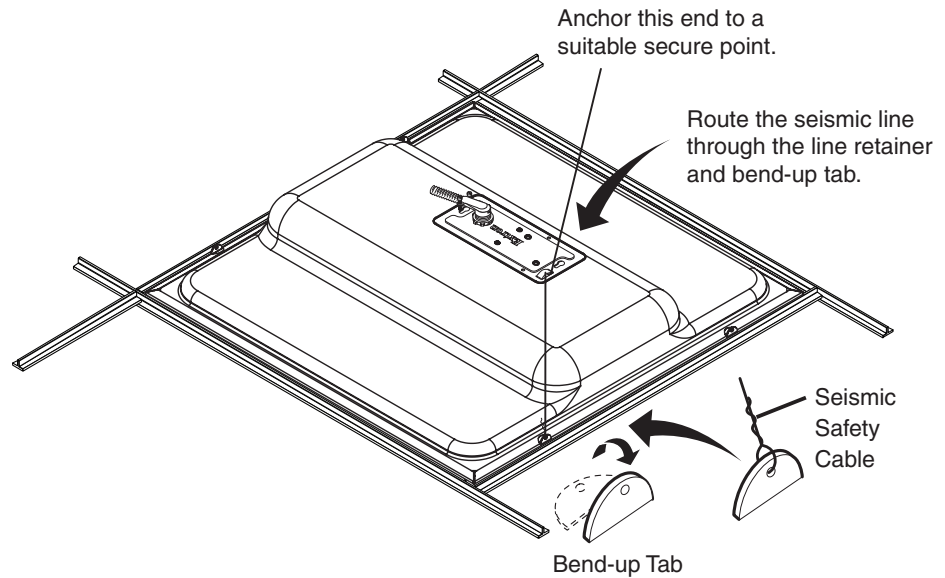
For installations in a 2' x 4' ceiling tile (which was cut in half in step 2), install the supplied T-rail crosspiece as shown below.



Set the speaker in place in the ceiling and position it so that the speaker edges are hidden by the support rails or T-rails.

- 13.** If seismic support lines are being used, install them. See the illustration below.

NOTE: Observe all applicable building codes and local ordinances when installing the speaker.



NOTE: Repeated bending of the bend-up tab, as shown above, may cause the tab to break off.

- a.** Temporarily remove a ceiling tile adjacent to the speaker and set it aside.
 - b.** Connect a seismic support cable through the cable pass through loop, and attach it to one of the seismic bend-up tabs located on either side of the speaker.
 - c.** Attach the other end of the cable to a sturdy part of the building (studs, roof struts, and the like).
 - d.** For additional support lines repeat as needed.
 - e.** Replace the ceiling tile removed in step **13a**.
- 14.** Check all wiring before powering up the amplifier.

Specifications, Dimensions and Packaging

This section discusses the specifications, part number, and packaging for the FF 220T speakers. Topics that are covered, include:

- [Specifications](#)
- [Dimensions](#)
- [Packaging](#)

Specifications

Audio/acoustic and electrical

Speaker type.....	1-way, full-range, in-ceiling speaker
Frequency range	68 Hz to 18 kHz, -10 dB, half space
Power capacity	16 W (rms) continuous pink noise 32 W (rms) continuous program
Nominal sensitivity	86 dB SPL, 1 watt, 1 m, half space
Nominal coverage angle	170° conical coverage
Nominal impedance.....	8 ohms per speaker
Driver	(1) 3" (76.2 mm) paper cone
Input connector	(1) 8 mm Euro-style captive screw terminal block, 7 pole
Tap settings	
70 V input	16 W, 8 W, 4 W, 2 W, 1 W, null (bypass 8 ohm direct connection)
100 V input	Null, 16 W, 8 W, 4 W, 2 W, 1 W (bypass 8 ohm direct connection)

General

Package	2 speakers (1 pair) with 2' (61 cm) cross bars
Temperature/humidity	Storage: -40 to +158 °F (-40 to +70 °C) / 10% to 90%, noncondensing Operating: +32 to +122 °F (0 to +50 °C) / 10% to 90%, noncondensing
Mounting	Drops into 2' x 2' (61 cm x 61 cm) or 2' x 4' (61 cm x 122 cm) suspended tile ceilings
Enclosure type	Composite, rectangular, with metal grille
Enclosure outer dimensions.....	3.25" H x 23.75" W x 11.75" D (8.3 cm H x 60.3 cm W x 29.9 cm D)
Product weight	Single: 5.1 lbs (2.3 kg)
Shipping weight	Pair: 17 lbs (8 kg) with mounting kit
Vibration	ISTA 1A in carton (International Safe Transit Association)
Regulatory compliance	

Safety NFPA90A, NFPA70;
UL Listed for use in plenum airspaces: meets UL 2043 for heat and smoke
release, meets UL 1480 for commercial and professional audio systems

Warranty 5 years parts and labor

NOTE: All nominal levels are at $\pm 10\%$.

NOTE: Specifications are subject to change without notice.

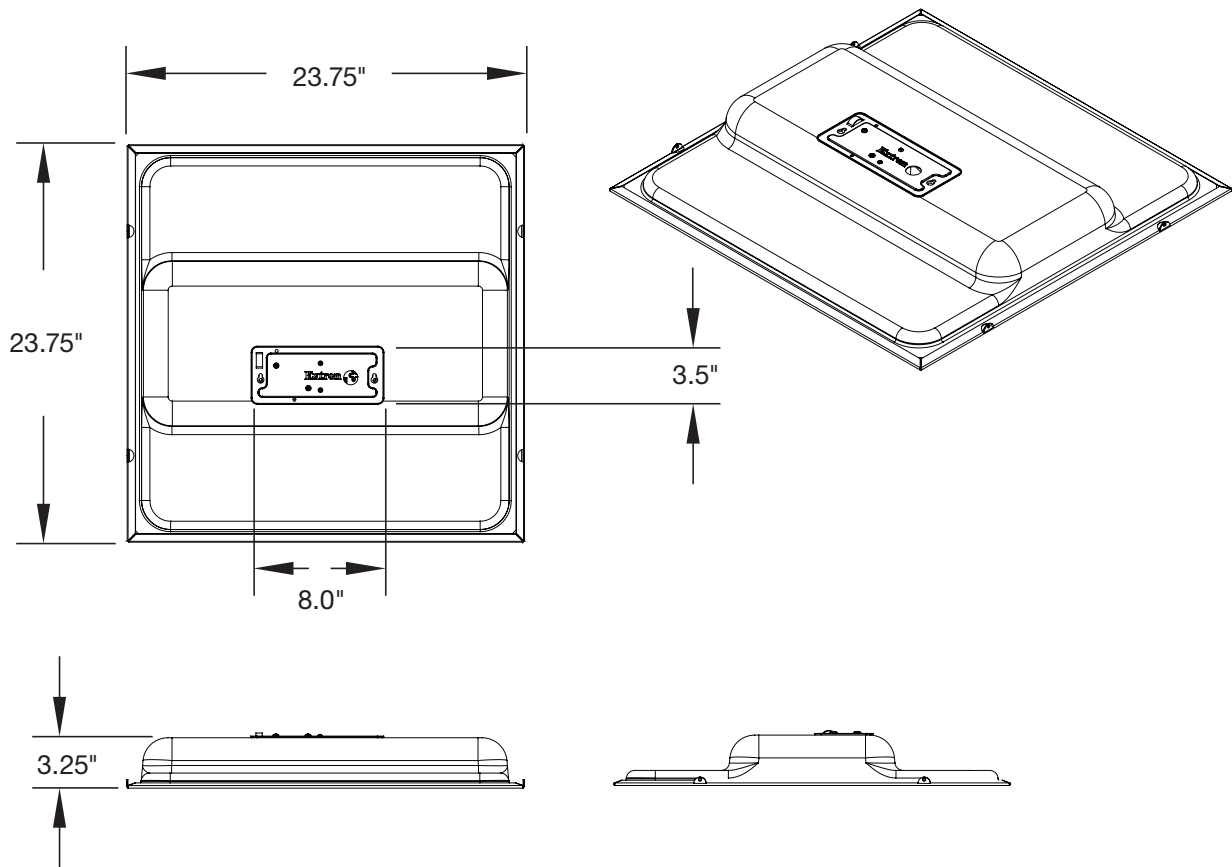
Part Numbers

Optional parts and accessories

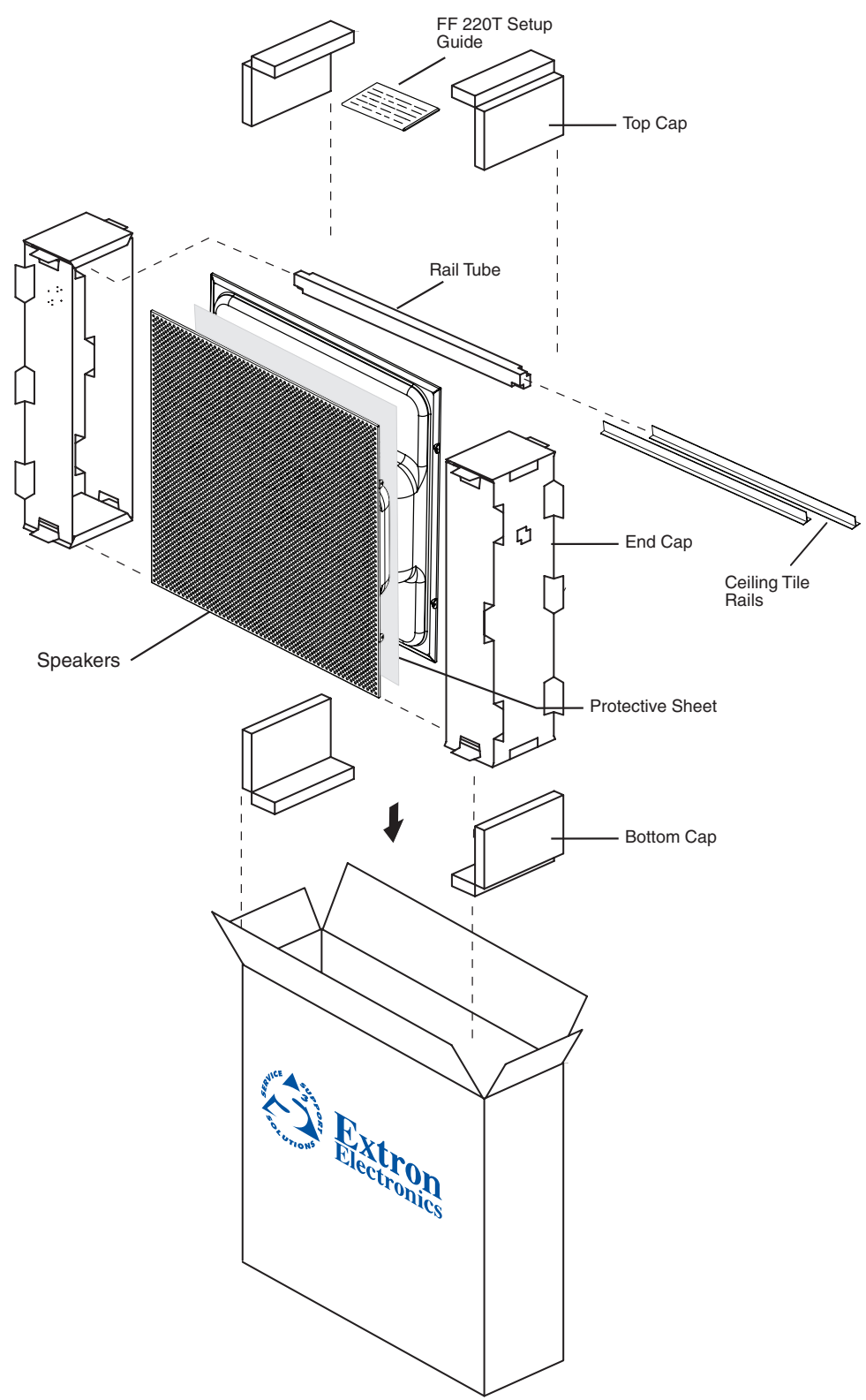
Part description	Replacement part number
Transformer replacement cover kit	881147-RK

Dimensions

FF 220T



Packaging



Extron® Warranty

Extron Electronics warrants this product against defects in materials and workmanship for a period of five years from the date of purchase. In the event of malfunction during the warranty period attributable directly to faulty workmanship and/or materials, Extron Electronics will, at its option, repair or replace said products or components, to whatever extent it shall deem necessary to restore said product to proper operating condition, provided that it is returned within the warranty period, with proof of purchase and description of malfunction to:

**USA, Canada, South America,
and Central America:**

Extron Electronics
1001 East Ball Road
Anaheim, CA 92805
U.S.A.

Japan:

Extron Electronics, Japan
Kyodo Building, 16 Ichibancho
Chiyoda-ku, Tokyo 102-0082
Japan

**Europe, Africa, and the Middle
East:**

Extron Europe
Hanzeboulevard 10
3825 PH Amersfoort
The Netherlands

China:

Extron China
686 Ronghua Road
Songjiang District
Shanghai 201611
China

Asia:

Extron Asia
135 Joo Seng Road, #04-01
PM Industrial Bldg.
Singapore 368363
Singapore

Middle East:

Extron Middle East
Dubai Airport Free Zone
F12, PO Box 293666
United Arab Emirates, Dubai

This Limited Warranty does not apply if the fault has been caused by misuse, improper handling care, electrical or mechanical abuse, abnormal operating conditions, or if modifications were made to the product that were not authorized by Extron.

NOTE: If a product is defective, please call Extron and ask for an Application Engineer to receive an RA (Return Authorization) number. This will begin the repair process.

USA: (714) 491-1500

Asia: +65.6383.4400

Europe: +31.33.453.4040

Japan: +81.3.3511.7655

Units must be returned insured, with shipping charges prepaid. If not insured, you assume the risk of loss or damage during shipment. Returned units must include the serial number and a description of the problem, as well as the name of the person to contact in case there are any questions.

Extron Electronics makes no further warranties either expressed or implied with respect to the product and its quality, performance, merchantability, or fitness for any particular use. In no event will Extron Electronics be liable for direct, indirect, or consequential damages resulting from any defect in this product even if Extron Electronics has been advised of such damage.

Please note that laws vary from state to state and country to country, and that some provisions of this warranty may not apply to you.

Extron USA - West Headquarters	Extron USA - East	Extron Europe	Extron Asia	Extron Japan	Extron China	Extron Middle East
+800.633.9876 Inside USA/Canada Only +1.714.491.1500 +1.714.491.1517 FAX	+800.633.9876 Inside USA/Canada Only +1.919.863.1794 +1.919.863.1797 FAX	+800.3987.6673 Inside Europe Only +31.33.453.4040 +31.33.453.4050 FAX	+800.7339.8766 Inside Asia Only +65.6383.4400 +65.6383.4664 FAX	+81.3.3511.7655 +81.3.3511.7656 FAX	+400.833.1568 Inside China Only +86.21.3760.1568 +86.21.3760.1566 FAX	+971.4.2991800 +971.4.2991880 FAX